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The Great Lakes Restoration Initiative: Background and Issues

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September 30, 2013

Congressional Research Service

7-5700

www.crs.gov

R43249

CRS REPORT

Prepared for Members and
Committees of Congress

Summary

The Great Lakes ecosystem is recognized by many as an international natural resource that has been altered by human activities and climate variability. These alterations have led to degraded water quality, diminished habitat, lower native fish and wildlife populations, and an altered ecosystem. In response, the federal governments of the United States and Canada and the state and provincial governments in the Great Lakes basin are implementing several restoration activities. These activities range from mitigating the harmful effects of toxic substances in lake waters to restoring fish habitat.

Most laws and efforts in the past addressed specific issues in the Great Lakes; a few addressed issues at the ecosystem level. This caused the Government Accountability Office and others to express the need for initiating and implementing a comprehensive approach for restoring the Great Lakes ecosystem. In 2010, the Great Lakes Restoration Initiative (GLRI) was proposed and implemented by the Obama Administration. The aim of GLRI is to restore the Great Lakes ecosystem under one initiative. Specifically, the GLRI is to restore and maintain the chemical, physical and biological integrity of the Great Lakes Basin Ecosystem by directing activities to address five focus areas: (1) toxic substances and Areas of Concern (these are areas in the Great Lakes that are environmentally degraded); (2) invasive species; (3) nearshore health and nonpoint source pollution; (4) habitat and wildlife protection and restoration; and (5) accountability, monitoring, evaluation, communication, and partnerships.

The Environmental Protection Agency (EPA) is the lead federal agency for implementing and administering GLRI. The EPA has received authority to distribute appropriated funds to several federal agencies, which then undertake restoration activities and projects. The EPA also administers grant programs to fund nonfederal projects and activities related to restoration. An interagency Great Lakes Task Force oversees the implementation of GLRI and created a strategy to guide restoration. The strategy (referred to as the Action Plan) provides a framework for restoring the Great Lakes ecosystem under GLRI from 2010 through 2014. For each focus area under the GLRI, the Action Plan provides a problem statement, a set of goals, interim objectives, progress measures, final targets, and principal activities for restoring the ecosystem. Restoration activities are being done under existing federal authorities. The GLRI has received approximately \$1.37 billion in appropriated funds since FY2010.

The scope and scale of this restoration initiative have led some to question its direction and duration. The GLRI does not specify what a restored ecosystem might look like, nor does it estimate how long restoration activities will need to be conducted, and how much restoration might cost. Some other questions surrounding this initiative include how the GLRI is governed and how federal and state restoration efforts are coordinated. Furthermore, GLRI remains an administrative initiative; there is no law that specifically authorizes GLRI, though Congress has appropriated funds to implement the program. Congress might consider these questions in oversight hearings or in legislation during the 113th Congress. Companion bills have been introduced in the 113th Congress to address GLRI. S. 1232 and H.R. 2773 would establish an administrative and management structure for restoration activities in the Great Lakes, authorize GLRI and appropriations for its implementation, specify the scope and function of GLRI, and authorize the coordinating role of the Great Lakes Interagency Task Force.

Contents

Introduction.....	1
Great Lakes Restoration Initiative	3
GLRI Action Plan	4
Funding.....	5
Implementation.....	6
Issues for Congress	8
Implementation and Management of GLRI.....	9
Decision-Making.....	9
Coordination.....	10
Examples from other Restoration Initiatives.....	11
S. 1232 and H.R. 2773	12
GLRI Action Plan	12
Vision of a Restored Great Lakes Ecosystem.....	14
Progress of Restoring the Great Lakes under the GLRI	15
Value of Restoring the Great Lakes	17
Concluding Remarks	19

Figures

Figure 1. The Great Lakes Basin	1
---------------------------------------	---

Tables

Table 1. Funding for GLRI, FY2010-FY2013 and FY2014 Administration's Request.....	6
Table 2. Summary of Funding Allocation by Focus Area, FY2010-FY2013 and FY2014 Administration's Request.....	7
Table 3. Allocation of GLRI Funds by Federal Agency, FY2010-FY2013 and FY2014 Administration's Request.....	7

Contacts

Author Contact Information.....	19
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Introduction

The Great Lakes ecosystem is the largest system of fresh surface water in the world. The watershed covers approximately 300,000 square miles and is shared by eight U.S. states (Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin) and one Canadian province (Ontario). (See **Figure 1.**) The Great Lakes contain nearly 90% of the surface freshwater of the United States and 20% of the surface freshwater of the world. In the last several decades, agricultural activity throughout the basin, and urban and industrial development concentrated along the shoreline, have degraded water quality in the Great Lakes, posing potential threats to the ecosystem.

Figure 1. The Great Lakes Basin



Source: U.S. Army Corps of Engineers, Detroit District.

Development has also led to changes in terrestrial and aquatic habitats, the introduction of non-native species, the contamination of sediments, and the listing of more than 50 threatened or endangered species in the ecosystem.¹ In response to deteriorating conditions in the ecosystem,

¹ These are species listed under the U.S. Endangered Species Act (16 U.S.C. §§1531-1544). For a more detailed (continued...)

the federal governments of the United States and Canada and the state and provincial governments in the Great Lakes basin have implemented several restoration activities.²

An estimated 40 million people rely on the Great Lakes ecosystem for jobs, drinking water, and recreation, among other things. In economic terms, the present-value benefit in 2007 of restoring the Great Lakes was estimated to be \$50 billion (in direct and indirect benefits) over the long term.³ The ultimate cost for restoring the Great Lakes is unclear, but the value of the potential benefits of restoration has caused, in part, several in Congress to regard restoring the Great Lakes a priority. The U.S. Congress has played a role in restoration efforts in the Great Lakes and enacted more than 30 laws over several years focused on restoring aspects of the Great Lakes ecosystem. These laws have authorized activities ranging from mitigating the harmful effects of toxic substances on water quality to mitigating damages caused by invasive species. Most laws address specific issues in the Great Lakes; yet few address the entire ecosystem. Over the years, several stakeholders have expressed the need for initiating and implementing a comprehensive approach for restoring the Great Lakes ecosystem.⁴

Restoration efforts in the Great Lakes have been implemented over several decades by the federal government, states, and local stakeholders. Efforts have focused on specific aspects of the ecosystem, but rarely the entire ecosystem. For example, the Great Lakes Water Quality Agreement (GLWQA), initially signed in 1972 and then revised several times afterwards, addresses water quality characteristics in the Great Lakes, but not habitat issues.⁵ After several years of restoration, the Government Accountability Office (GAO) concluded that progress in restoring the Great Lakes was slow and restoration efforts were too loosely organized.⁶ Specific concerns included the slow rate of cleaning up toxic sediments, insufficient governance to provide direction for ecosystem restoration activities, and lack of a comprehensive plan to guide restoration of the Great Lakes ecosystem.⁷

In 2004 a federal Great Lakes Interagency Task Force (hereinafter referred to as the Task Force)⁸ was created to provide strategic direction for Great Lakes policies on restoration and to form a regional collaboration of stakeholders interested in restoring the Great Lakes ecosystem. This

(...continued)

summary of causes and symptoms of ecosystem deterioration in the Great Lakes, see Donald Scavia et al., *Prescription for Great Lakes Ecosystem Protection and Restoration*, National Wildlife Federation, Report, December 2005, pp. 1-39.

² For more information on U.S. federal and state programs aimed at restoring the Great Lakes, see U.S. Government Accountability Office, *Great Lakes: An Overall Strategy and Indicators for Measuring Progress Are Needed to Better Achieve Restoration Goals*, GAO-03-515 (Washington, DC: April 2003). Hereafter referred to as *An Overall Strategy and Indicators for Measuring Progress Are Needed to Better Achieve Restoration Goals*.

³ John C. Austin et al., *Healthy Waters, Strong Economy: The Economic Benefits of Restoring the Great Lakes Ecosystem*, The Brookings Institution, September 2007.

⁴ For example, see *An Overall Strategy and Indicators for Measuring Progress Are Needed to Better Achieve Restoration Goals*, and Melissa Malott, *Restoration Plan Key to Helping Lake Michigan, Other Great Lakes, Clean Wisconsin*, May 29, 2008.

⁵ The Agreement addresses shared priorities of the United States and Canada with respect to the Great Lakes and aims to restore and protect the chemical, physical, and biological integrity of the waters of the Great Lakes.

⁶ See *An Overall Strategy and Indicators for Measuring Progress Are Needed to Better Achieve Restoration Goals*.

⁷ Ibid.

⁸ The Great Lakes Interagency Task Force was created by an executive order in 2002 (E. O. 12240). Its purpose is to provide strategic direction on federal Great Lakes policy. The Task Force is chaired by the Administrator of the U.S. Environmental Protection Agency (EPA) and contains 10 agency and cabinet-level officers.

collaboration was termed the Great Lakes Regional Collaboration. It consisted of over 1,500 stakeholders and released the Great Lakes Regional Collaboration Strategy (hereinafter referred to as the Strategy).⁹ The Strategy recommended implementing a series of actions and activities to start the restoration of the Great Lakes ecosystem over a five-year period from 2006 to 2011. The Strategy encompassed eight issue areas: aquatic invasive species, fish and wildlife habitat (habitat/species), coastal health, contaminated sediments, nonpoint source pollution, toxic pollutants, indicators and information, and sustainable development. The total cost of implementing the Strategy was estimated to be \$20 billion over the five-year period. The Strategy (as a whole) is not being implemented, although several restoration programs included in the Strategy are underway or ongoing in the Great Lakes Restoration Initiative (GLRI) and other federal and state activities.

Great Lakes Restoration Initiative

The GLRI was proposed in 2009 by the Obama Administration, and implemented in 2010. The GLRI is derived from the Strategy and aims to be consistent with the Strategy and GLWQA. The goal of the GLRI is to restore and maintain the chemical, physical and biological integrity of the Great Lakes Basin Ecosystem by directing activities to address five focus areas:¹⁰

- toxic substances and Areas of Concern;¹¹
- invasive species;
- nearshore health and nonpoint source pollution;
- habitat and wildlife protection and restoration;
- accountability, monitoring, evaluation, communication, and partnerships.

Federal efforts to restore the Great Lakes ecosystem are coordinated by the Task Force. The EPA, serving as chair of the Task Force, is the lead federal agency for implementing and administering the GLRI. In appropriations laws from FY2010 to FY2013, the EPA has been given authority to receive and distribute congressionally appropriated funds to several federal agencies, which then undertake restoration activities and projects in the Great Lakes. EPA also implements restoration activities that are funded by the GLRI through the Great Lakes National Program Office (GLNPO). Restoration activities are being done under existing federal authorities that address restoration in the Great Lakes. There is no single law that specifically authorizes the GLRI as a restoration initiative for the Great Lakes.

The implementation of the GLRI is being guided by recommendations from a Great Lakes Advisory Board (GLAB). The GLAB provides advice on Great Lakes protection and restoration policy, long term goals of protection and restoration, annual priorities to protect and restore the

⁹ The Great Lakes Regional Collaboration Strategy can be found at <http://www.glerc.us/strategy.html>.

¹⁰ GLRI does not include water supply issues, which are addressed through the Great Lakes-St. Lawrence River Basin Water Resources Compact. Water infrastructure needs in the Great Lakes are not addressed by the GLRI, but through funding provided by the Drinking Water State Revolving Loans and the Clean Water State Revolving Funds in EPA.

¹¹ Areas of Concern are geographic areas within the Great Lakes Basin that have been designated for restoration under Annex 2 of the Great Lakes Water Quality Agreement. Specifically, these areas “fail to meet the general or specific objectives of the Agreement where such failure has caused or is likely to cause impairment of beneficial use of the area’s ability to support aquatic life.”

Great Lakes, and issues addressed by the Task Force.¹² GLAB consists of 18 members who represent nonfederal stakeholders (e.g., non-governmental organizations, state agencies, tribal interests, and universities, among others) in the GLRI. GLAB is also expected to provide advice on the implementation of the Great Lakes Water Quality Agreement.¹³

GLRI Action Plan

The implementation of GLRI is also being guided by a Great Lakes Restoration Initiative Action Plan (hereinafter referred to as the Action Plan), which was created by the Task Force.¹⁴ The Action Plan provides a framework for restoring the Great Lakes ecosystem from 2010 through 2014.¹⁵ The Action Plan was derived from the Strategy, as well as from several other area-specific plans and programs such as the GLWQA and Great Lakes Binational Toxic Strategy,¹⁶ among others. For each focus area under the GLRI, the Action Plan provides a problem statement, a set of goals, interim objectives, progress measures, final targets, and principal activities for restoring the ecosystem. The principal actions in the Plan are not specific projects; rather, they are broad actions that address the objectives of the focus areas. Each year, federal agencies identify projects they plan to take to implement the Action Plan. Project selection is guided by criteria such as:

- ability to achieve measurable outcomes that are linked to high priority issues;
- ability to advance existing Great Lakes activities or the priorities of existing plans for restoring the Great Lakes, including, but not limited to, Lakewide Management Plans, Remedial Action Plans for Areas of Concern,¹⁷ and the Great Lakes Binational Toxic Strategy;¹⁸
- feasibility of prompt implementation and ability to yield near-term tangible results;
- strong interagency or inter-organizational collaboration and coordination;
- adherence to the best available science;
- public support for the project; and
- low transaction costs and leverage of nonfederal resources.

¹² U.S. Environmental Protection Agency Charter, *Great Lakes Advisory Board*, Filed June 22, 2012, http://www.epa.gov/ocem/faca/pdf/2012/2012_glab_charter_establishment.pdf.

¹³ Ibid, section 3.

¹⁴ White House Council on Environmental Quality, U.S. Environmental Protection Agency, et al., *Great Lakes Restoration Initiative Action Plan*, Great Lakes Interagency Task Force, February 21, 2010. Hereafter referred to as *The GLRI Action Plan*.

¹⁵ The Task Force is planning to revise the Action Plan for FY2015 to FY2019.

¹⁶ The Great Lakes Binational Toxic Strategy is a strategy put forth by Canada and the United States that aims to virtually eliminate persistent toxic substances resulting from human activities in the Great Lakes Basin. See the Strategy at http://binational.net/bns/strategy_en.pdf

¹⁷ In 1987, the United States and Canada identified 43 Areas of Concern (AOC) in the Great Lakes basin that represented the most degraded portions of the ecosystem. The most common reason for degradation in AOCs is contaminated sediments.

¹⁸ For a full list of pre-existing plans, see page 11 of *The GLRI Action Plan*.

Projects are geared toward meeting overall and interim goals under each focus area. Overall goals are thematic. For example, Goal 1 under Habitat and Wildlife Protection and Restoration Focus Area states that “protection and restoration of Great Lakes aquatic and terrestrial habitats, including physical, chemical, and biological processes and ecosystem functions, maintain or improve the conditions of native fish and wildlife.” Interim goals have quantifiable measures such as “by 2014, 3,000 miles of Great Lakes rivers and tributaries will be reopened and 500 barriers to fish will be removed or bypassed.” Measures of progress are quantifiable indicators that are related to the goals. For example, to evaluate progress in restoring habitat and wildlife protection, some measures used are miles of river reopened for fish passage, and percentage of U.S. coastal Great Lakes wetlands assessed. Measures have a quantified baseline and targets for each year between 2010 and 2014.

Monitoring and oversight mechanisms are also discussed in the Action Plan. An accountability system was created to measure and track progress of projects and the implementation of the Action Plan. Further, an interactive electronic map was created that shows the location and description of each project.¹⁹ Recipients of funding are required to submit status reports on projects and progress towards interim measures and goals of the Action Plan. The EPA collects these reports and compiles an annual report to the President on outcomes and measures. The report also lists funding allocations for participating agencies by fiscal year. (See **Table 4**.) The most recent report discusses progress in FY2011. There are mixed results for meeting goals and targets, and in several cases, the report states that it is too early to evaluate progress and that several indicators cannot be determined.²⁰

Funding

The estimated cost for implementing GLRI for the first five years is approximately \$2.2 billion according to the Action Plan. There is no estimate as to how much it will take for the ecosystem to be fully restored, or how long the restoration effort is expected to take. In its inaugural year (FY2010), the GLRI received \$475 million in appropriations provided to the EPA.²¹ The EPA also was granted the authority to transfer funds to other federal agencies for restoration activities in the Great Lakes and provide grants to state, non-governmental, and private stakeholders. Of the funds appropriated, approximately \$400 million were new funds that had not been associated with appropriations for existing federal restoration programs. Approximately \$75 million was appropriated for existing EPA programs, which addressed Great Lakes restoration. Funding for the next three years remained steady at approximately \$300 million, and the Administration’s request for FY2014 is \$300 million.²² (See **Table 1**.) In these appropriations laws, funds were given to the EPA to carry out the GLRI as well as implement activities under the Great Lakes Water Quality Agreement.

Restoration activities are funded through grants and transfers to other federal agencies. A transfer of funds to an agency is usually done through cooperative or interagency agreements. Funds for

¹⁹ See <http://greatlakesrestoration.us/>

²⁰ U.S. Environmental Protection Agency and Great Lakes Interagency Task Force, *Great Lakes Restoration Initiative: Fiscal Year. 2011 Report to Congress and the President*, U.S. Environmental Protection Agency, September 2011, pp. 1-44, <http://greatlakesrestoration.us/pdfs/2011-glri-report-to-congress.pdf>.

²¹ P.L. 111-88.

²² FY2013 funding numbers are not necessarily comparable to other years because post-sequestration funding estimates are not publicly available.

other federal agencies are to be considered *new* funds for restoration. Agencies are expected to maintain their base level of funding for restoration activities and identify new activities to support GLRI. Therefore total annual funding for restoring the Great Lakes ecosystem is funding for the GLRI plus funding for base restoration programs. Base funding for Great Lakes ecosystem restoration activities has been reported in the Great Lakes Ecosystem Restoration Crosscut Budget. For example, for FY2011, base funding for Great Lakes restoration was approximately \$677.0 million. With GLRI funding, total funding for restoration was reported at \$977.0 million.²³

Table 1. Funding for GLRI, FY2010-FY2013 and FY2014 Administration's Request
(in \$millions)

Year	Funding
FY2010	\$475.0
FY2011	\$300.0
FY2012	\$299.5
FY2013	\$298.8 ^a
FY2014 Request	\$300.0

Source: Great Lakes Restoration Initiative at <http://greatlakesrestoration.us/index.html> and Senate Committee on Appropriations, *FY14 Interior Explanatory Statement*, at <http://www.appropriations.senate.gov/news.cfm?method=news.view&id=d1037190-bf9c-420c-a8a5-79c0ef9c495c>.

- a. This figure reflects the 0.2% across the board rescission for FY2013, but not the deductions due to sequestration. Figures are taken from Senate Committee on Appropriations, *FY14 Interior Explanatory Statement*, at <http://www.appropriations.senate.gov/news.cfm?method=news.view&id=d1037190-bf9c-420c-a8a5-79c0ef9c495c>.

Implementation

GLRI has received appropriations from FY2010 to FY2013 and is being implemented according to the Action Plan. There has been over a billion dollars appropriated to implement GLRI via its five focus areas through FY2013. (See **Table 2**.)

Most of the appropriations have gone to the EPA, with significant amounts of funding going to U.S. Fish and Wildlife Service (FWS), National Oceanic and Atmospheric Administration (NOAA), and the U.S. Army Corps of Engineers (Corps). Note that appropriations for EPA are for EPA directed programs and efforts, as well as grant programs for stakeholder research and restoration activities. (See **Table 3**.)

²³ Office of Management and Budget, *Great Lakes Crosscut Report to Congress*, Office of Management and Budget, May 2011, pp. 38.

Table 2. Summary of Funding Allocation by Focus Area, FY2010-FY2013 and FY2014 Administration's Request

(in \$millions)

Focus Area	FY2010	FY2011	FY2012	FY2013	FY2014 request
Toxic Substances and Area of Concern	\$146.9	\$100.4	\$106.3	n/a	\$110.7
Invasive Species	60.3	57.5	57.5	n/a	53.0
Nearshore Health and Nonpoint Source Pollution	97.3	49.3	54.8	n/a	56.4
Habitat and Wildlife Protection and Restoration	105.3	63.0	56.8	n/a	58.8
Accountability, Education, Monitoring, Evaluation, Communication, and Partnerships	65.2	29.3	24.1	n/a	21.1
TOTAL	475.0	299.4	299.5	298.8	300.0

Source: U.S. Environmental Protection Agency, *U.S. Environmental Protection Agency FY2014 Justification of Appropriation Estimates for the Committee on Appropriations*, U.S. Environmental Protection Agency, Budget Justification, April 2013, pp. 284-285. n/a = not available.

Note: FY2013 funding for focus area categories has not been reported to include sequestration and the rescission in FY2013.

Table 3. Allocation of GLRI Funds by Federal Agency, FY2010-FY2013 and FY2014 Administration's Request

(in \$millions)

Agency	FY2010	FY2011	FY2012	FY2013	FY2014 request
U.S. Coast Guard	\$6.3	\$2.7	\$2.7	n/a	\$1.9
National Oceanic and Atmospheric Administration	30.5	18.3	15.6	n/a	15.2
U.S. Army Corps of Engineers	49.6	31.4	33.8	n/a	20.6
Bureau of Indian Affairs	3.4	6.3	4.7	n/a	4.0
National Park Service	10.5	4.9	3.4	n/a	3.1
U.S. Fish and Wildlife Service	69.3	48.7	43.6	n/a	32.7
U.S. Geological Survey	23.7	14.5	12.4	n/a	11.4
Federal Highway Administration	2.5	1.2	1.2	n/a	1.0
Maritime Administration	4.0	2.7	2.4	n/a	2.3
Agency for Toxic Substances and Disease Registry	5.5	2.2	2.2	n/a	1.7
Animal and Plant Health Inspection Service	1.9	0.6	1.1	n/a	0.9
Natural Resources Conservation Service	34.1	16.8	24.2	n/a	23.3
U.S. Forest Service	15.5	8.9	6.7	n/a	6.3

Agency	FY2010	FY2011	FY2012	FY2013	FY2014 request
Environmental Protection Agency (including International Joint Commission, Great Lakes Fisheries Commission, and other agreements)	218.1	140.1	145.5	n/a	156.1
Multiple Agencies: Asian Carp				n/a	19.5
TOTAL	475.0	299.4	299.5	298.8²⁴	300.0

Source: U.S. Environmental Protection Agency, *U.S. Environmental Protection Agency FY2014 Justification of Appropriation Estimates for the Committee on Appropriations*, U.S. Environmental Protection Agency, Budget Justification, April 2013, pp. 284-285.

Note: FY2013 funding for agencies have not been reported to include sequestration and the rescission in FY2013.

Implementation of GLRI is guided, in part, by provisions in the Interior and Related Agencies Appropriations laws and associated committee and conference reports. In FY2012 appropriations, for example, GLRI was instructed to follow guidelines under H.Rept. 112-151.²⁵ This committee report stated that EPA should transfer funds to other agencies more expeditiously. Further, the report states that funds are to supplement and expand existing programs, rather than supplant them. The committee report also directed EPA and other federal agencies to prioritize actions that implement “action-oriented” projects in lieu of additional studies, monitoring, and evaluations. Lastly, the report stated that the committee expects to see measurable results from funding over the last few years.²⁶

Issues for Congress

Since FY2010, the implementation of the GLRI represents a significant increase in funding and activities for Great Lakes restoration and a novel attempt at restoring the ecosystem holistically. Some issues with GLRI that have emerged include clarity about the management structure of GLRI, the potential integration of GLRI with existing federal and state restoration efforts in the Great Lakes, the effectiveness of the Action Plan in laying out a strategy for fully restoring the Great Lakes, the overall direction and duration of restoring the Great Lakes, and the funding needed to implement and complete the GLRI. Some of these issues are addressed, in part, by proposed legislation introduced in the 113th Congress. S. 1232 and H.R. 2773 would establish a governance and management structure for restoration activities in the Great Lakes, authorize GLRI and appropriations for its implementation, specify the scope and function of GLRI, and authorize the coordinating role of the Great Lakes Interagency Task Force. A summary of how these bills amend current law and analysis of how they might change current practices in GLRI is

²⁴ Figures are taken from Senate Committee on Appropriations, *FY14 Interior Explanatory Statement*, at <http://www.appropriations.senate.gov/news.cfm?method=news.view&id=d1037190-bf9c-420c-a8a5-79c0ef9c495c>.

²⁵ U.S. Congress, House Committee on Appropriations, *Department of Interior, Environment, and Related Agencies Appropriations Bill, 2012*, Report to Accompany H.R. 2584, 112th Cong., 1st sess., July 19, 2011, H.Rept. 112-151 (Washington: GPO, 2011), pp. 64-65.

²⁶ U.S. Congress, House Committee on Appropriations, *Department of Interior, Environment, and Related Agencies Appropriations Bill, 2012*, Report to Accompany H.R. 2584, 112th Cong., 1st sess., July 19, 2011, H.Rept. 112-151 (Washington: GPO, 2011), pp. 64-65.

provided in the text box below. The rest of this section reviews the aforementioned issues that might be of interest to Congress.

Introduced Legislation Authorizing GLRI in 113th Congress

S. 1232 and H.R. 2773 are two bills in the 113th Congress that would amend the Federal Water Pollution Control Act (33 U.S.C. 1268 (a)) to authorize the GLRI and associated functions and activities related to its implementation. The bills are largely similar, with some differences in the terms they would define, the structure of meetings held by GLAB, composition of the Task Force, and authorized funding for carry out projects that address remediation of sediment contamination in Areas of Concern. Broadly speaking, both bills would broaden the law to authorize the implementation of GLRI and related activities. Presently, the law authorizes the EPA to conduct restoration activities in the Great Lakes and coordinate activities with other federal agencies.

Both bills would update the findings and purpose of Section 118 to include attaining the goals detailed in the Great Lakes Restoration Initiative Action Plan (Action Plan), Great Lakes Regional Collaboration Strategy (Regional Strategy), and Great Lakes Water Quality Agreement (Agreement). In addition, both bills would expand the forms of federal collaboration in the Great Lakes region to include the funding of contracts and interagency agreements, as well as grants, for the protection, restoration, and pollution control in the ecosystem.

Both bills would amend the law to authorize the Great Lakes Advisory Board (GLAB), the Great Lakes Restoration Initiative (GLRI), and the Great Lakes Interagency Task Force (Task Force). The bills would specifically authorize GLRI to implement projects and activities that would implement the Strategy and Agreement. This would appear to broaden the scope of the GLRI as it would encompass several goals and objectives listed under the Strategy and Agreement. The bills state that federal agencies should maintain funding for baseline activities, and no funds would be provided for water infrastructure projects that also receive funding from state water pollution and drinking water revolving funds.

The Task Force under both bills would be the primary coordinating entity for restoration activities by collaborating with Canada, coordinating the development of federal restoration policies and projects, and assisting in the management of the Great Lakes System. The Task Force would also be responsible for developing outcome-based goals for the ecosystem, and reviewing and updating the Regional Strategy and Action Plan as necessary. The Task Force would also provide reports to Congress that discusses what actions have been implemented or not implemented with recommendations for changes. The Administrator of the EPA would be responsible for submitting an annual progress report to Congress, and the Director of the Office of Management and Budget would be directed to submit a crosscut budget to Congress.

Both bills would authorize \$475 million in appropriations for each of fiscal years 2014 to 2018 to implement GLRI. S. 1232 would authorize \$150 million for each fiscal year from 2014 through 2018 for projects determined to address remediation of sediment contamination in areas of concern; H.R. 2773 only would authorize \$100 million for each fiscal year from 2014 through 2018 for these projects. In addition, both S. 1232 and H.R. 2773 would authorize an additional \$25 million for each fiscal year from 2014 through 2018 for the Great Lakes Program Office.

Implementation and Management of GLRI

Decision-Making

Restoration efforts in the Great Lakes have historically been conducted by several federal or state agencies, largely without a central organizing or governing entity. At the federal level, restoration activities have been conducted under various authorities, with several activities being implemented by the EPA through its Great Lakes National Program Office. In the past, the GAO suggested that a lack of centralized leadership in the Great Lakes restoration activities could detract from the effectiveness and prominence of restoration efforts.²⁷ Questions such as who is in charge, and how are the implementation of restoration activities to be governed, were posed.²⁸

²⁷ U.S. Government Accountability Office, *Organizational Leadership and Restoration Goals Need to Be Better* (continued...)

In part, GLRI has addressed these questions in program documents, but some questions about the governance of the restoration initiative remain. For example, it is unclear if a central governing structure that oversees all restoration activities (i.e., all federal, state, and local efforts) exists. The GLRI does not define a central governing structure or decision-making process for guiding all restoration efforts, but appears to promote EPA as the lead federal agency for implementing the initiative. For example, EPA received funds from FY2010 to FY2013 to implement the GLRI and was given authority to transfer these funds to other federal agencies to conduct GLRI activities. EPA was directed to provide annual reports that list funds given to each federal agency and describe program accomplishments. EPA created the Action Plan with the Great Lakes Task Force. While EPA appears to be in charge of implementing GLRI, it does not have the authority to direct the entire Great Lakes restoration effort that includes non-GLRI federal activities and activities done by non-federal stakeholders.²⁹ The Task Force appears to be responsible for coordinating all restoration activities in the Great Lakes ecosystem and for implementing the Action Plan an integrated manner.³⁰ These tasks, however, do not appear to constitute decision-making functions;³¹ rather it promotes the Task Force as a coordinating entity for all restoration and resource management activities in the Great Lakes.

To temper this issue, the scope of GLRI might not be intended to cover all aspects of Great Lakes restoration. For example, the GLRI is focused on new federal activities and not pre-existing baseline activities, and does not include programs that address infrastructure that affects water quality. However, under this notion, it becomes apparent that GLRI should not be considered a centralized coordinating or management approach to restoring the Great Lakes. This might bring up the earlier question of whether lacking a centralized coordinating or management structure will negatively affect restoration in the Great Lakes.

Coordination

Lacking a coordinated effort to restore the Great Lakes ecosystem is an issue that has been raised in the past for Great Lakes restoration. The GAO asserted that restoration efforts in the Great Lakes suffered from inadequate coordination.³² GLRI addresses this assertion by stating that it aims to build on existing federal, state, and local activities and draw upon a series of ongoing restoration efforts outlined in existing plans and programs.³³ Further, the Task Force is expected to coordinate Great Lakes restoration efforts among federal agencies.

(...continued)

Defined for Monitoring Restoration Progress, Highlights of GAO-04-1024, September 2004, p. 1.

²⁸ *Ibid.*

²⁹ Non-federal stakeholders are expected to receive funding from GLRI through grants. They are also expected to work with EPA to establish a process to provide guidance for implementing the GLRI. Further, one longterm goal of the draft Action Plan is to create mechanisms that give stakeholders and citizens the opportunity to provide input to governments on Great Lakes issues and concerns.

³⁰ *GLRI Action Plan*, p. 13.

³¹ Decision-making actions could include actions such as directing which projects to implement; directing the implementation of the restoration initiative, including making changes to implementation; defining the scope of restoration; and allocating funds.

³² *An Overall Strategy and Indicators for Measuring Progress Are Needed to Better Achieve Restoration Goals*, p. 35.

³³ *GLRI Action Plan*, p. 11.

It is unclear, however, how state and local restoration efforts in the Great Lakes are to be coordinated with the GLRI efforts. Coordination with nonfederal entities in the Great Lakes might be significant due to the number of entities involved in restoration, including efforts from eight states. Some might contend that absent a formal coordination role for nonfederal entities, restoration projects might overlap. Further, some contend that with greater coordination among federal and non-federal stakeholders, there might be opportunities to leverage federal resources with state or local resources to accomplish restoration projects.³⁴ There is no formal role for nonfederal representatives to coordinate with federal actions in a governance entity. The Task Force does not have nonfederal members. Coordination among nonfederal members could be addressed by the GLAB, however their charter does not specify that coordination is a priority. GLAB is to provide advice on the implementation of GLRI. Some have also questioned whether GLRI should have a formal collaboration with Canada and Ontario to coordinate restoration activities.

Some restoration activities conducted by nonfederal entities are done under the GLRI with grants from federal agencies. Grants are awarded for projects in one of the focus areas and grantees are required to input project information (description of work and project outputs) into the Great Lakes Accountability System (GLAS). This information could be used to facilitate coordinated approaches to restoration and to determine if projects have similar objectives, but non-GLRI projects are not inserted into GLAS making analysis of overlap or potential for collaboration difficult.

Outside of GLRI efforts there have been attempts to organize and report all federal and state activities related to ecosystem restoration in the Great Lakes. For example, in the last few years, the creation of a Great Lakes crosscut budget has been mandated by Congress in annual appropriations laws.³⁵ The resulting crosscut budget contained information on GLRI funding as well as other base federal funding for Great Lakes restoration. It also reported some state spending for restoration efforts; however, just Wisconsin reported funding for FY2012. Some might view the creation and dissemination of a broad crosscut budget as one tool to organize and potentially coordinate all Great Lakes restoration activities.

Examples from other Restoration Initiatives

There are several approaches for addressing governance and coordination that are exemplified in other large-scale restoration initiatives that could be contemplated for the GLRI. For example, Congress could create a single entity that centrally coordinates restoration activities at all stakeholder levels. This could include all federal activities and state activities. The restoration initiative in the Platte River is guided by a Governance Committee (GC), which is responsible for implementing the Program.³⁶ The GC is a ten-member body with representatives from Colorado, Nebraska, and Wyoming, U.S. Bureau of Reclamation (USBR), U.S. Fish and Wildlife Service (FWS), water users, and environmental entities. The GC makes programmatic decisions including changes to budgets and changes to restoration activities. The GC justifies these types of changes with new information or recommendations from adaptive management efforts. An Oversight

³⁴ For example, see Lynn McClure, Joel Brammeier, and John Jackson, *Comments on the Great Lakes Restoration Initiative Action Plan Update*, Healing Our Waters-Great Lakes Coalition, July 12, 2013, p. 7. Hereafter referred to as *Comments on the GLRI Action Plan Update*.

³⁵ For example, see P.L. 112-74, section 737.

³⁶ For more information, see <https://www.platteriverprogram.org/AboutPRRIP/Pages/ProgramInformation.aspx>.

Committee, consisting of the Secretary of the Interior and the Governors of Colorado, Nebraska, and Wyoming, is responsible for approving significant modifications to the program.³⁷

Several other ecosystem restoration initiatives are governed by hybrid entities with both federal and state partners. In some cases, these governing bodies are limited in their ability to make decisions. Their decision-making authority extends to certain types of decisions such as creating a restoration plan, conducting science, and monitoring restoration projects. However, project implementation might be left to individual state and federal agencies rather than the hybrid entity. Examples of this type of governing entity include the Chesapeake Bay Executive Council, Long Island Sound Study Policy Committee, and the South Florida Ecosystem Restoration Task Force.

S. 1232 and H.R. 2773

Bills in the 113th Congress address governance and coordination under GLRI. S. 1232 and H.R. 2773 would authorize the EPA to select programs and projects for Great Lakes protection and restoration. The bill states that the EPA would consult with federal partners, including the Task Force, and consider recommendations of GLAB, when selecting projects to implement.³⁸ The bill would also authorize the Task Force and direct it to carry out several coordinating activities related to restoring the Great Lakes ecosystem. Some examples include collaborating with Canada and bi-national bodies involved in activities related to the Great Lakes; managing the Great Lakes system, considering recommendations from GLAB; coordinating government actions associated with implementing restoration plans such as the Action Plan, Strategy, and GLWQA; and developing outcome-based goals for the Great Lakes System.³⁹ Under these bills, EPA would be the lead agency in implementing GLRI, and the Task Force would be the lead entity in coordinating overall federal and nonfederal efforts to address the Great Lakes ecosystem.

In addition, these bills would require the GLRI to prioritize work done by nonfederal partners for priority areas each year and would require that federal projects and nonfederal projects are implemented in coordination with states and other organizations.⁴⁰ Further, the bills would direct the Office of Management and Budget to create a Great Lakes crosscut budget to report funding and projects funded by GLRI and potentially other non-GLRI activities. The crosscut budget would also be required to identify all expenditures by federal and state governments on Great Lakes restoration activities since FY2004. If enacted, these bills would create a permanent requirement for creating a crosscut budget.

GLRI Action Plan

The lack of a comprehensive plan or strategy to guide restoration efforts in the Great Lakes was a concern in the past for restoration efforts in the Great Lakes.⁴¹ Without a plan, the GAO reported that organizations developed their own strategies for restoration, inadvertently making coordination among them difficult. The GLRI Action Plan was created in part to address this

³⁷ The modifications are specified in the Final Platte River Recovery Implementation Program, and include such factors as changing the regulatory certainty afforded under the Program.

³⁸ Section 2(b)(4) of S. 1232.

³⁹ Section 2(b)(5) of S. 1232.

⁴⁰ Section 2(b)(4) of S. 1232.

⁴¹ *An Overall Strategy and Indicators for Measuring Progress Are Needed to Better Achieve Restoration Goals*, p. 35.

concern. The Action Plan discusses broad themes related to restoration and provides a set of short term goals for measuring progress. The Action Plan specifically states that it does not address water infrastructure programs that include the Clean Water or Drinking Water State Revolving Fund program, nor base federal agency restoration activities.

Some could contend that the Action Plan still is not a comprehensive plan for restoration because some restoration themes and projects are not included. For example, the Action Plan lists themes that are to be addressed by restoration activities, but does not provide details on specific restoration projects that are to be implemented or how projects are connected to the restoration of the ecosystem. Further, the Action Plan does not cover all federal restoration activities (e.g., those ongoing restoration activities initiated before GLRI and the Action Plan were created) and does not include or address all state or local restoration activities.

To counter these points some might contend that the scope of the Action Plan is only based on implementing GLRI (i.e., not all federal restoration activities) and that specificity of projects to be funded and implemented depends on annual decisions and recommendations made by the EPA, participating federal agencies, and the Task Force. Therefore, it would not be possible to list all restoration projects upfront. Further, they might contend that broad restoration actions in the Great Lakes ecosystems are also, in part, guided by the Strategy and the Great Lakes Water Quality Agreement. The Strategy lists thematic areas for restoration and key actions for restoration; and GLWQA contains long term goals for restoration that would encompass all restoration activities related to water quality. Both bills in the 113th Congress would authorize restoration actions to achieve goals established in the Action Plan, Strategy, and GLWQA.⁴² This would create a broader restoration effort that goes beyond just implementing the Action Plan and would include actions and goals in both the Strategy and GLWQA.

Examples of Non-GLRI Activities Related to Restoration

There are several restoration activities in the Great Lakes that are not covered under GLRI. These activities are termed base-level restoration activities, and are generally restoration activities that federal agencies have been implementing in the Great Lakes ecosystem before GLRI was initiated. The exception to this description is some base activities implemented by the EPA that directly address the Great Lakes (e.g., remediation of contaminated sediments in the Great Lakes ecosystem), which are included in GLRI. Further, several of the base-level activities are implemented on a national level with a national level scope and purpose. A portion of program funds are invested in the Great Lakes region and these activities generally have secondary benefits for restoring the Great Lakes ecosystem. The appropriations estimated for non-GLRI restoration activities are much higher than GLRI appropriations. For example, in FY2012, non-GLRI restoration activities were appropriated approximately \$579 million (GLRI was appropriated \$300 million). Of this amount, nearly 87% was for national level programs.

Some selected examples of non-GLRI restoration activities include:

- Agricultural conservation programs administered by the Natural Resources Conservation Service such as the Environmental Quality Incentives Program and the Wetlands Reserve Program
- Clean Water State Revolving Fund administered by the EPA
- Coastal Zone Management grants administered by the National Oceanic and Atmospheric Administration
- National Wildlife Refuge System (in the Great Lakes region) and Great Lakes Fish and Wildlife Restoration program administered by FWS
- Great Lakes Fishery Commission overseen by the U.S. Department of State

⁴² See section 2(a)(2) of S. 1232.

Issues related to the implementation of the Action Plan could raise questions about how the Action Plan will integrate GLRI activities with existing federal, state, and local activities. The GLRI does not include all federal and nonfederal actions related to restoring the Great Lakes in the Action Plan.⁴³ It specifically states that it will guide the implementation of the GLRI, not necessarily all restoration efforts in the Great Lakes ecosystem.⁴⁴ The Action Plan does state that it will build upon past programs and plans that are now in place. It is unclear if the project selection, oversight, and reporting requirements under GLRI directly cover non-GLRI activities in addition to taking them into consideration.

If GLRI does not cover all new and existing federal activities, some questions might arise, including:

- Will GLRI reporting and oversight activities include non-GLRI funded efforts?
- How will GLRI integrate non-GLRI projects in the restoration effort, or how would duplication of efforts be avoided?
- Are interim goals and overall goals a true indication of GLRI efforts?
- Will federal agencies maintain non-GLRI activities or eventually integrate them into GLRI?

Some of these questions might be addressed in the pending revision to the Action Plan which addresses restoration activities from 2015 to 2019. Some contend that the revised Action Plan should contain greater emphasis on monitoring and adaptive management and focus on achieving and assessing outcome-oriented results (i.e., results that reflect the condition of the ecosystem) rather than just output-oriented results (i.e., results that are reported from specific projects).⁴⁵ Creating a revised Action Plan based on the results and outcomes of projects implemented under the first Action Plan could be difficult if sufficient results have not been reported in time for the revision. This might not allow for the revised Action Plan to incorporate lessons learned and project results from the first phase of restoration.

Vision of a Restored Great Lakes Ecosystem

The GLRI does not present an overall vision for what a restored Great Lakes ecosystem should look like and function. An overall vision is broadly discussed in the Action Plan,⁴⁶ but specific goals and targets for restoration are provided for just the first four years of restoration. Furthermore, there is no indication of how long it will take to restore the Great Lakes ecosystem. The Task Force, under GLAB, is currently revising the Action Plan to describe activities and goals from FY2015 to FY2019, yet it is unclear if this represents a stage for restoration or a plan to complete restoration. Some might counter this concern by noting that it is difficult to fully contemplate a restored Great Lakes ecosystem because of its size and complexity. They might also point to the Great Lakes Water Quality Agreement as a guiding document for long-term restoration. The Agreement contains general objectives for restoring the waters of the Great

⁴³ *The GLRI Action Plan*, p. 13.

⁴⁴ The Action Plan notes that it is not the “only tool in the toolbox” referring to other programs that address restoration. See *The GLRI Action Plan*, p. 4.

⁴⁵ For example, see *Comments on the GLRI Action Plan Update*, p. 2.

⁴⁶ *The GLRI Action Plan*, p. 9.

Lakes, including that the waters should be a source of high-quality drinking water, free from pollutants that could be harmful to humans, and support healthy and productive wetlands, among other things.⁴⁷ Further, the Agreement contains 10 Annexes that describe long-term objectives for addressing specific issues related to restoration such as diminishing excess nutrient deposition (e.g., phosphorus and nitrogen) and controlling aquatic invasive species, among others. In the GLWQA there is no indication of how long it will take to restore the waters of the Great Lakes, nor estimate of how much it will cost.

The lack of defining what a restored ecosystem might resemble under the GLRI or how long it might take to restore the ecosystem could generate questions related to how much restoring and maintaining the Great Lakes ecosystem could ultimately cost. Other questions might include what the long-term plans are for restoration and if any major restoration projects are being contemplated; and if restoration might involve manipulating water flows into or out of the Great Lakes to enhance habitat for native species or restrict the entry of aquatic nuisance species.⁴⁸ Answers to these questions could involve actions that could be potentially controversial.⁴⁸

Long-term issues associated with the Great Lakes ecosystem such as the control and eradication of invasive species or the potential effects of climate change might not be adequately addressed in five-year increments. This and other restoration issues might require a longer planning horizon than five years to address. The potential effects of climate change on the Great Lakes ecosystem should be incorporated into the Action Plan according to some.⁴⁹ The Action Plan addresses climate change by noting that it could have implications for focus areas and would be addressed where appropriate. Some contend that addressing the effects of climate change in the selection and implementation of restoration projects is important for the long term viability of restoration.⁵⁰ Climate change could potentially alter Great Lakes water levels, which have a significant connection to several ecosystem properties and economic factors in the Great Lakes.

S. 1232 and H.R. 2773 address this issue, in part, by authorizing the Task Force to review the Strategy and Action Plan every five years. The Task Force would be authorized to update and revise the Action Plan. This policy would allow for revisions to reflect changes in the ecosystem, but might not generate a vision for the restored ecosystem or result in providing the estimated duration of restoration.

Progress of Restoring the Great Lakes under the GLRI

Implementation of GLRI began in 2010; however, it is unclear how much more is needed to restore the ecosystem. GLRI aims to track progress of restoration within the timeframe of the Action Plan. GLRI has an accountability system (Great Lakes Accountability System; GLAS) that lists projects and provides a description and their funding.⁵¹ Further, GLAS requests project

⁴⁷ Article 3(1)(a) of the Great Lakes Water Quality Agreement.

⁴⁸ This issue has generated controversy among stakeholders bordering Lake Ontario. A proposal by the International Joint Commission to alter water flows from the Moses Saunders Dam and other structures for ecosystem restoration and other purposes have caused some property owners along the southern shore of Lake Ontario to criticize the plan because of its potential to flood their property.

⁴⁹ *Comments on the GLRI Action Plan Update*, p. 3.

⁵⁰ *Comments on the GLRI Action Plan Update*, p. 3.

⁵¹ U.S. Environmental Protection Agency, *Great Lakes Restoration Initiative Accountability System User Guide*, Version 1.11, March 2012, p. 1, <http://www.glri.us/granteeinfo.html>.

managers to identify the focus area they are working under and any quantifiable results from the project (e.g., acres of wetlands restored). GLAS documentation does suggest that results from projects could be aggregated and tracked, and that information will allow managers to adjust priorities based on data derived from GLAS. However, based on this description, some might contend that it is unclear how the completion or progress of these projects relates to the overall restoration of the ecosystem or ecosystem processes. For example, one researcher commented that many of the restoration projects are completed in “silos” without a comprehensive assessment of how projects relate to overall restoration.⁵² In addition, he questioned whether measuring and reporting indicators will provide an understanding of how the overall ecosystem is improving or increasing its resilience. Others emphasize that outcomes of the restoration initiative are unclear, even though indicators and measurements are reported. In response to these claims, GLRI notes that monitoring and evaluation of progress is conducted on a regular basis.⁵³ Further, GLAS is expected to release a set of “dashboard indicators” that aim to provide a visual representation of progress toward metrics.⁵⁴ To address this point, some have called for broadening monitoring, and reframing the analyses and reporting of the results so that progress toward outcomes can be evaluated.⁵⁵ Both proposed bills authorizing GLRI in the 113th Congress would direct the Task Force to create outcome based goals for the Great Lakes. This could address, in part, the issue of evaluating restoration progress at the regional or ecosystem level, rather than at the project level. However, developing outcome based goals could be perceived as different from developing a strategy for achieving outcomes.

The GLRI accountability approach under GLAS appears only to be applicable to GLRI projects. It is unclear if it will be expanded to include non-GLRI and nonfederal activities. Without taking into account all efforts to restore the ecosystem, it would be difficult to evaluate the effectiveness and progress of GLRI. If GLRI and non-GLRI activities are contributing to restoration, how does one evaluate only GLRI activities? Progress toward meeting goals was reported in annual reports to Congress for FY2010 and FY2011. Progress reported for GLRI is mixed in these reports with several entries stating that indicators have not yet been determined. The reports also do not differentiate between progress made by GLRI projects versus non-GLRI federal and state actions. To counter this sentiment, one could contend that progress toward goals may not be measurable after a few years of implementing restoration activities. For many ecological indicators, progress might not be seen until several years after restoration actions have been implemented.

There do not appear to be any consequences for not progressing or reaching goals set by the GLRI. For example, if restoration targets are not being met, there does not appear to be a policy mechanism to alter the implementation or direction of GLRI efforts. Several other restoration initiatives have had mixed experiences working with quantitative goals and indicators of progress. For example, in the Chesapeake Bay and the Everglades restoration initiatives, some initial goals have not been met on schedule, resulting in criticism of the initiative. Policy mechanisms to address these shortcomings include revising the goals and indicators of progress,

⁵² Don Scavia, “Avoiding the Tipping Point: A Decade of Developments,” Session Talk, Milwaukee, WI, September 10, 2013.

⁵³ Cameron Davis, “Avoiding the Tipping Point: A Decade of Developments,” Response to Session Talk, Milwaukee, WI, September 10, 2013.

⁵⁴ U.S. Environmental Protection Agency, *Great Lakes Restoration Initiative Accountability System User Guide*, Version 1.11, March 2012, p. 1, <http://www.glri.us/granteeinfo.html>.

⁵⁵ Don Scavia, “Avoiding the Tipping Point: A Decade of Developments,” Session Talk, Milwaukee, WI, September 10, 2013.

or implementing an adaptive management program.⁵⁶ Adaptive management can also be a policy tool that would allow changes in projects and goals if new circumstances arise or if progress stalls. The GLRI encourages agencies to incorporate adaptive management in implementing restoration projects, but has not implemented an adaptive management process. A recent draft report, however, proposes an adaptive management framework for restoration activities in the Great Lakes.⁵⁷ The objective of this framework would be to address programmatic decisions related to restoration. It would also address priorities for implementing projects and refine decision-making. Adaptive management can also be implemented on the programmatic scale. It could be used to measure and potentially adjust how the program is being implemented and how overall restoration objectives are being met.⁵⁸

The lack of long-term restoration targets and a vision for a restored ecosystem might make measuring the progress of restoration difficult. Indeed, some have noted that GLRI projects and their outputs should be connected to an over-arching plan for restoration.⁵⁹ GLRI has a set of defined targets that are intended to be a measure of progress for restoring the Great Lakes. The targets are quantifiable and are listed for each year between 2010 and 2014 under each focus area.⁶⁰ However, restoration targets beyond the five-year frame are not discussed in the Action Plan.⁶¹ This brings up the question of how many goals or steps are needed to be met for fully restoring the Great Lakes, and where is the current Great Lakes ecosystem on this scale. Several other large-scale ecosystem restoration initiatives have estimated the total duration and cost for restoration, yet most of them have had to alter their funding and time of completion estimates as restoration progressed.

Value of Restoring the Great Lakes

The question of whether an ecosystem restoration initiative is worth funding and whether restoration will ultimately provide an overall net financial benefit to the region has been brought up for several ecosystem restoration initiatives, including the Great Lakes. Answering this question for the Great Lakes is complicated since the total cost of restoration and its duration is unclear. The Brookings Institution has asserted that restoring the Great Lakes will not only help the ecosystem, but will provide an economic benefit to the region.⁶² Their 2007 study reported the estimated financial benefits associated with improvements in Great Lakes environmental quality included higher catch rates in recreational fisheries, lower water treatment costs, more and better

⁵⁶ Adaptive management is the process of incorporating new scientific and programmatic information into the implementation of a project or plan to ensure that the goals of the activity are being reached efficiently. It promotes flexible decision-making to modify existing activities or create new activities if new circumstances arise (e.g., new scientific information) or if projects are not meeting their goals.

⁵⁷ Science Subgroup of the Great Lakes Regional Working Group, *Great Lakes Restoration Initiative: Adaptive Science-Based Framework for Great Lakes Restoration*, Great Lakes Regional Working Group, Draft Report, May 21, 2013, pp. 1-32.

⁵⁸ For more information on adaptive management, see CRS Report R41671, *Adaptive Management for Ecosystem Restoration: Analysis and Issues for Congress*, coordinated by Charles V. Stern.

⁵⁹ *Comments on the GLRI Action Plan Update*, p. 7.

⁶⁰ These measures of progress are listed in the Action Plan.

⁶¹ The Great Lakes Water Quality Agreement, however, has some long-term restoration targets and objectives that do not appear to be time-limited.

⁶² John C. Austin et al., *Healthy Waters, Strong Economy: The Economic Benefits of Restoring the Great Lakes Ecosystem*, The Brookings Institution, September 2007.

swimming opportunities, improved bird watching, more hunting opportunities, and benefits from removal of contaminated sediment. The sum of present-value benefits in 2007 from specific improvements in the environment totaled approximately \$50 billion for long-term gains and \$30-\$50 billion for short-term gains.⁶³ The full cost of restoration, however, was not identified in this study making it impossible to evaluate the net benefit of restoration.

The total cost of funding the complete restoration of the Great Lakes ecosystem has not been estimated by the GLRI. GLRI estimates that \$2.2 billion in funding is needed for the first five years of the restoration. It is unknown how much funding it will take to restore the ecosystem and what the ultimate benefits of restoration might be.⁶⁴ Further, it is unclear where along the restoration timeline GLRI might be because the problem and proposed solution has not been fully defined. Reporting by GLRI does not project how much longer restoration might take. Whether the first phase (2010 through 2014) covers a small or large space along the restoration timeline might influence decisions on how much funding to provide for the initiative.

Questions related to the cost of restoring the Great Lakes ecosystem and whether that cost is justified could be heightened because annual funding for restoring the Great Lakes is larger than that for other prominent ecosystems. Funding for all federal restoration activities in the Great Lakes has ranged from \$649 million to \$687 million annually from FY2004 to FY2009.⁶⁵ With GLRI, the FY2010 federal funding for Great Lakes restoration was approximately \$1.2 billion (non-GLRI funding was approximately \$720 million). Other ecosystem restoration efforts in areas such as the Everglades and Chesapeake Bay have lower annual federal funding (e.g., approximately \$350 million and \$400 - \$450 million annually, respectively). Some might contend that the expansive size of the Great Lakes ecosystem warrants a higher price tag than other large-scale ecosystem restoration initiatives in the United States, and that funding needs for restoration are on par with other ecosystems. Further, they might argue that the Great Lakes ecosystem is one of the largest in the country, and potentially could contribute the greatest value to people. However, some others might contend that federal funding for GLRI is too high because combined with non-GLRI funding it is higher than any other ecosystem.

S. 1232 would authorize \$475 million for each fiscal year from FY2014 to FY2018 to carry out GLRI. Further, it would authorize \$150 million for each fiscal year during the same period to carry out projects that address remediation of sediment contamination in Areas of Concern, and \$25 million for each fiscal year during the same period for the Great Lakes Program Office to administer and conduct restoration activities. H.R. 2773 would authorize the same amount of funding for GLRI and the Program Office, and \$100 million for addressing remediation of sediment contamination in Areas of Concern.

⁶³ John C. Austin et al., *Healthy Waters, Strong Economy: The Economic Benefits of Restoring the Great Lakes Ecosystem*, The Brookings Institution, September 2007.

⁶⁴ For comparison, the Great Lakes Regional Collaboration Strategy calls for spending \$20 billion over a five-year period to restore the Great Lakes ecosystem. Of this total, \$13.7 billion in new funds is for wastewater treatment system improvements (the anticipated federal share is \$7.5 billion and nonfederal share is \$6.2 billion), and \$1.3 billion for improvement of drinking water treatment facilities. These activities are specifically not included in the Action Plan. See The Great Lakes Regional Collaboration, *The Great Lakes Regional Collaboration Strategy* (December 2005), accessed at <http://www.glrc.us/>.

⁶⁵ Office of Management and Budget, *Great Lakes Restoration Crosscut: Report to Congress*, Office of Management and Budget, Washington, DC, March 2010, http://www.whitehouse.gov/sites/default/files/omb/assets/legislative_reports/2010_great_lakes_report.pdf.

Concluding Remarks

The GLRI is a large-scale ecosystem restoration initiative that aims to restore the Great Lakes ecosystem under the framework of an Action Plan. It attempts to address past criticisms of Great Lakes restoration activities that included claims of a loosely coordinated restoration effort, and a restoration effort that lacks a comprehensive plan. The Great Lakes ecosystem is complex and covers a vast geographical area. This inherently leads to scientific uncertainties in implementing restoration projects and unforeseen circumstances in the evolution of the ecosystem. These factors and others may cause restoration efforts under the GLRI to face persistent and new questions by Congress and other stakeholders. Some might question how long restoration in the Great Lakes may take and how much it could ultimately cost. Further, questions related to how the GLRI is implemented and whether it will eventually encompass all federal activities, state activities, and local activities related to Great Lakes restoration could be asked and discussed. The GLRI is not authorized in law, but in the 113th Congress, two bills were introduced to authorize the initiative. Both bills would address similar issues, including authorizing the EPA as the lead agency for implementing GLRI, and authorizing the Task Force to coordinate among federal and non-federal stakeholders. They would also authorize \$475 million annually from FY2014 to FY2018 to fund GLRI activities.

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